Growing Cold Hardy Figs in Maine

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By Bill Errickson

Farmers in the Northeast struggle with a short growing season, cool temperatures and harsh, unpredictable winters, so it behooves them to diversify their enterprises. Fruit production can add resilience and security to a local or regional food system, and consumer demand for local fruits in the Northeast is high. However, producing many traditional fruit species can be ecologically and financially challenging. Apples and plums, for example, frequently suffer from pest pressure and are subject to crop failure when cold spring temperatures and rain during bloom time disrupt pollination. The pesticides often used to produce a marketable fruit crop may pose environmental and health risks. Adding species to our agricultural systems may help minimize these potential problems.

The protection of a hoophouse (and wrapping plants in winter with fabric row cover) offers promise for growing figs in Maine. Photo by Lauren Errickson

Figs, native to the Middle East and Western Asia, are one of the earliest cultivated plants in the world, with origins that go back over 11,000 years. Exceptionally high in calcium, the fruits grow on self-fertile trees with minimal pest and disease issues. They can be enjoyed fresh, and they dry well for winter storage, potentially providing off-season income for farmers and local fruit for consumers.

Ripe figs. Photo by Lauren Errickson

Currently figs are shipped great distances to consumers in Maine, but they can be produced here if offered adequate microclimates. While annual crops such as tomatoes and overwintered greens, and specialty crops such as ginger, are now produced in high tunnels, perennial crops offer the prospect of reduced soil disturbance and thus less nutrient, moisture and organic matter loss during production. They can also decrease the region's dependence on fossil fuels for producing and importing fruit. The major challenges of producing figs in the Northeast are overwintering the plants and ripening the fruit.

While some home gardeners have been experimenting with growing figs in the Northeast, scientific field trials are lacking. Trials in Egypt (1), Turkey (2) and Hawaii (3) have evaluated multiple fig varieties for productivity, but they did not evaluate cold-hardy figs specifically, nor did they press the climatic limits of the species.

Previous research funded by SARE (USDA's Sustainable Agriculture Research and Education program) in New Jersey showed that figs are a viable high tunnel crop, producing higher yields of marketable fruit and exhibiting higher rates of winter survival than field-grown figs (4). Additional research demonstrated the viability of perennial fruit crops such as strawberries (5,7), blackberries (6) and raspberries (7) in high tunnels. Ginger, which thrives in a tropical environment, is a viable Northeast hoop house crop(8). Renowned Maine grower and consultant Mark Fulford suggested to me that perennial figs have an even higher likelihood of survival and success as a northern high tunnel crop than tropical ginger.

In 2014 my wife, Lauren, and I received a SARE Farmer Grant to evaluate the potential of growing cold-hardy figs in a high tunnel at our Singing Nettle Farm in Brooks, Maine. We applied successful findings of the New Jersey fig study (using appropriate high tunnel technology) to further test the climate boundaries of fig varieties and assess whether a marketable and economically viable crop could be produced in a northern New England state. The varieties we studied were said to be hardy, when planted unprotected, to approximately -15 F (Zone 5). Brooks is currently rated as Zone 5b. High tunnels, generally understood to moderate extreme temperature fluctuations during the coldest winter months, are also expected to have 7- to 12-degree F higher temperatures than uncovered land during the winter months (9).

In the spring of 2014, we planted four varieties of zone 5-hardy fig trees – Gino's Black (GB), Marsailles Black VS (MBVS), Ronde de Bordeaux (RDB) and Sal's GS (SGS), sourced from Kerry Sullivan in Laconia, New Hampshire, in a 26- x 48-foot high tunnel. We planted eight trees of each variety (32 trees total) on 5-foot centers. Before planting, we amended the soil for optimum fig tree nutrition with a mineral and worm castings blend, which included granite meal, colloidal phosphate, bone char and kelp meal (based on results of a high tunnel soil test). We mulched all trees with wood chips and landscape fabric and watered with drip irrigation at regular intervals throughout the growing season. In the fall of 2014, we wrapped four trees (half the total number) of each variety with fabric row cover for the winter to see whether this provided extra protection from freezing temperatures.

In 2014 and 2015 we recorded flowering dates; harvest dates; fruit yields (total, marketable and unripe); fruit size (average weight per fruit); peak plant height; Brix levels (a measure of the sugar concentration) and taste. In the spring of 2015, we measured the percentage of winter injury/dieback on each tree.

We experienced outdoor temperatures of -15 F during the winter of 2014-2015. All of the fig trees died back to the ground, whether wrapped or not.

In the spring, nearly all of the fig plants began to regrow from the base – except for two of the four uncovered GB trees, which were killed by the low winter temperatures. Thus the GB variety showed us an instance in which wrapping the trees did seem to increase the percentage of survivability among plants, as all four covered GB plants began to regrow from the base as spring temperatures warmed.

Figs produce an inflorescence called a syconium that contains numerous unisexual flowers that are not outwardly visible; so we recorded flowering dates when we first saw syconium formation. In 2015 we saw the first syconiums on SGS on June 19, followed by MBVS on June 26 and RDB and GB on July 3.

We measured stem length (a total measurement of all branches, including the main trunks and lateral growth) of covered and uncovered trees (Figure 1). Vegetative growth was greater for covered trees of GB, MBVS and RDB, but not for SGS. RDB had the most vegetative growth of the four varieties, whether covered or uncovered. At this stage, however, the greater vegetative growth observed on some varieties does not necessarily appear to lead to a significant increase in fruit set. Observing older, more established fig trees over time would likely give a better indication of a relationship between vegetative growth and fruit set. (Note: This was a preliminary study, so we did not determine whether results were statistically significant.)

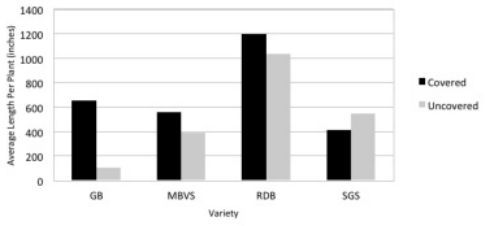

Figure 1: Vegetative growth of fig trees in 2015

The fig trees in our study reached a maximum of about 8 feet in height during their second growing season in the high tunnel. Depending on the variety and climate conditions in which they are grown, figs may have to be pruned to maintain a

manageable size in the hoop house. We did not prune any of our trees as we did not want to interfere with the study results by pruning uneven amounts of growth from different trees, but we could see that caring for plants and harvesting would be easier if we pruned branches growing into the aisles between rows. We recommend delaying pruning until you can see how much top growth survived the winter. In the spring, when regrowth begins, start by pruning out all deadwood. Then determine which green wood to prune during the season according to your growing practices, perhaps topping the figs at the necessary height to confine them to the hoop house.

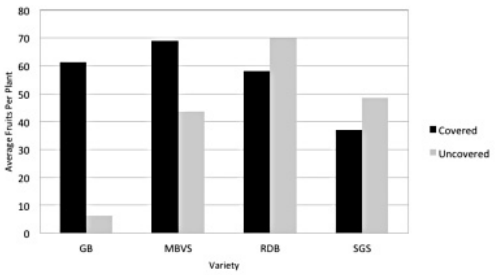

Figure 2: Fruit set of figs in 2015

Covered GB and MBVS trees set more fruit than uncovered trees (Fig. 2). Row cover protection did not appear to increase fruit set in RDB and SGS. Uncovered RDB set the most fruit per plant (but had the fewest ripe fruits), closely followed by covered MBVS. Fruit generally ripens in September or October. In theory a warm fall season will give more time for fruit ripening before dropping temperatures begin to damage fruit on the trees.

All varieties produced ripe fruits when covered; only RDB produced ripe fruits when uncovered (Table 1). Covered SGS trees were the first to bear. We determined the mean weight of fruit produced per plant, but note that these were young plants. The amount of fruit produced per plant should increase as plants mature.

Table 1: Ripe fruit set

Variety	# fruits on four plants	Mean weight of fruits (oz.)	Mean weight of fruit per plant (oz.)	Brix
GB covered	3	0.33	0.25	16
MBVS covered	17	0.57	2.42	19
RDB covered	12	0.56	1.68	16.5
SGS covered	23	0.52	2.99	17.7
RDB uncovered	2	0.55	0.28	16

In independent blind taste tests, participants preferred MBVS above the other varieties for texture, sweetness, floral/aromatic and overall flavor. Participants suggested banana flavors for GB; sweet melon for MBVS; a subtle spicy sweetness for RDB and a very good, complex flavor for SGS. While the RDB figs did not perform well overall in taste tests, we believe they may not have ripened to their full potential, affecting these scores. We harvested the RDB fruits when we noticed a few were beginning to rot on the trees after exposure to declining fall temperatures. Warmer years may provide enough heat long enough into the season to ripen fruits to a more desirable flavor. Taste is subjective and may vary according to participants, but the study gave some good initial feedback regarding varietal differences.

Our initial findings suggest that figs can be ripened in high tunnels in Maine. Our study participants preferred MBVS for flavor; it and SGS have good potential to provide a reliable, flavorful crop. While RDB had the most fruit set, it lacked in flavor, possibly due to incomplete ripeness; in warm seasons, however, RDB may perform well. This study should be considered a foundation for additional trials in Maine.

We believe figs offer potential for a good source of income for growers. Mature figs often yield up to 25 pounds per tree in warmer climates, but overall yield in Maine will likely be lower due to colder temperatures and a slower start to the growing season (which the high tunnel should moderate). We do not have data on mature trees in Maine to accurately determine profitability, but fresh figs often sell for up to $8 to $10 per pound, so an optimistic gross income estimate is about $200 to $250 per plant.

Yields would improve with more winter protection. Most of our trees regrew from the base after dying back in the frigid winter of 2014-2015, but this level of winter injury would most likely set plants back in terms of earliness and amount of ripe fruit. If growers can maintain better above-ground winter survivability, plants will have a better start and may produce a better crop the following year.

Growers could, for example, lay trees down in the fall by cutting the roots on one side with a spade and covering them with a heavy layer of mulch. In the spring, the trees could be stood up again, although they may need additional support on the side with the severed roots. Stephen Biggs recommends this practice in "Grow Figs Where You Think You Can't." He also offers this tip and other thoughts on growing practices in his handout "Overwintering Fig Plants: Strategies for Northern Growers," available at www.grow-figs.com.

Minimal supplemental heat may also be an option, especially if additional crops, such as winter greens, are grown simultaneously to further justify the extra expense and energy use. In summer, additional crops such as melons and cucumbers may be grown as an understory companion to figs, which will become the greenhouse canopy.

In addition, the older growth of figs is more winter hardy than new growth, according to Edible Landscaping (https://ediblelandscaping.com/careguide/Fig/), so supplemental heat may not be so beneficial after the first year or two.

Figs are fairly easy to propagate from cuttings in the spring, so propagation can provide more plants and/or income. Varieties that have been demonstrated as cold hardy and productive in the north would likely be a popular commodity, especially if propagated as direct descendants of proven plants.

Exploring the possibilities of new crops for the region can be exciting, and nothing beats eating a fresh fig right off the tree. In addition to the varieties trialed at Singing Nettle Farm, Brown Turkey and Hardy Chicago may bring success if you can be sure you have a true strain. Purchase trees from a trusted, reputable source, and, ideally, source nursery stock originating from parent plants that have been grown in a climate similar to your own. Call nursery suppliers to ask about their varieties. Learn as much as you can! We recommend starting with a few trees of different varieties to assess their survivability and productivity in your area and to make sure you enjoy their taste. Record yields, taste preferences, etc., to share with the agricultural community. Choose your varieties, hone your winter protection skills and enjoy!

(1) Abo-El-Ez, A., Mostafa, R., and Badawny, I. "Growth and productivity of three fig (Ficus carica) cultivars grown under upper Egypt conditions." Australian Journal of Basic & Applied Sciences, Feb. 2013, Vol. 7 Issue 2, p. 709-714.

(2) Caliskan, O. and Polat, A. "Morphological diversity among fig (Ficus carica) accessions sampled from the Eastern Mediterranean region of Turkey." Turkish Journal of Agriculture & Forestry, April 2012, Vol. 36 Issue 2, p. 179-193.

(3) Love, K. 2007. “Choosing the best figs for Hawaii.” SARE project number FW07-034.

(4) Sheets, M. 2011. “Raising fig trees in high tunnels in the northeast.” SARE project number FNE11-727.

(5) Coldwell, D. and Wells, O. 1997. “High tunnel strawberries for New England.” SARE project number FNE97-164.

(6) Gundacker, E. 2009. “Growing blackberries organically under high tunnels for winter protection and increased production.” SARE project number FNC09-749.

(7) Mielke, D. 2002. “The use of moveable high tunnels in the organic production of strawberries, potatoes, and raspberries.” SARE project number FNC02-387.

(8) Bahret, M. 2007. “Greenhouse ginger cultivation in the Northeast, Part II.” SARE project number FNE07-596.

(9) Rutgers New Jersey Agricultural Experiment Station. “High Tunnels in New Jersey.” Accessed Nov. 22, 2013

About the author: Bill and Lauren Errickson operated Singing Nettle Farm, a horse-powered, off-grid, MOFGA-certified organic vegetable, fruit, flower and nursery enterprise, for five years in Brooks, Maine. Bill currently teaches at Kean University and Stockton University in New Jersey.